

AD-A091 541

BAKER (MICHAEL) JR INC BEAVER PA
NATIONAL DAM SAFETY PROGRAM. PARKER DAM (NDI NUMBER PA 01126, P--ETC(U)
AUG 80 J A DZIUBEK

F/6 13/13

DACW31-80-C-0025

NL

UNCLASSIFIED

100
AL
00054



END
DATE
FILMED
12 80
DTIC

AD A091541

SUSQUEHANNA RIVER BASIN

⑥ National Dam Safety Program

PARKER DAM

~~CLEARFIELD COUNTY, COMMONWEALTH OF PENNSYLVANIA~~

NDI No. PA 01126

PennDER No. 17-87

Number

Susquehanna River Basin, Laurel Run,
Clearfield County, Pennsylvania

⑪ Aug. 80

PHASE I INSPECTION REPORT
~~NATIONAL DAM SAFETY PROGRAM~~

⑫ 1371

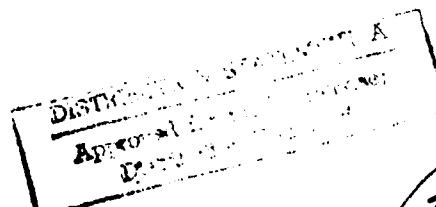
⑮ DANC31-80-C-0025

NOV 7 1980

Prepared for: DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

Prepared by: MICHAEL BAKER, JR., INC.
Consulting Engineers
4301 Dutch Ridge Road
Beaver, Pennsylvania 15009

⑩ John A. Dziubek



410795

Y/B

PREFACE

This report is prepared under guidance contained in the "Recommended Guidelines for Safety Inspection of Dams," for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I Inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

Accession For	
NTIS CP-21	
DTIC 1 R	
Unannounced	
Initial location	
50-6-100	
By	
Distribution/	
Availability Codes	
Avail and/or	
Dist	
Special	

PHASE I REPORT
NATIONAL DAM INSPECTION PROGRAM

Parker Dam, Clearfield County, Pennsylvania
NDI No. PA 01126, PennDER No. 17-87
Laurel Run
Inspected 25 June 1980

↓
ASSESSMENT OF
GENERAL CONDITIONS

Parker Dam is classified as a "Significant" hazard - "Small" size dam. The dam and reservoir, owned by the Commonwealth of Pennsylvania, Department of Environmental Resources, are used for recreational purposes. The dam and appurtenant structures were found to be in good overall condition at the time of the inspection.

A spillway design flood (SDF) in the range of the 100-year flood to the 1/2 Probable Maximum Flood (1/2 PMF) is required for Parker Dam. Since the dam is in the middle of the "Small" size category according to storage capacity, the 1/2 PMF was selected as the SDF. Hydrologic/hydraulic evaluations, performed in accordance with procedures established by the Baltimore District of the U.S. Army Corps of Engineers, revealed that the available spillway capacity is much greater than the maximum flow expected during the SDF. Therefore, the dam will not be overtopped during the SDF and the spillways are considered to be adequate.

The inspection revealed certain items of remedial work which should be performed immediately by the owner of the dam. These include:

- 1) Fill the depression in the downstream toe of the embankment immediately to the right of the outlet works.
- 2) Fill the animal burrows on the downstream face of the embankment immediately to the left of the outlet works and approximately 10 feet to the right of the outlet works.
- 3) Fill the low area on the crest and upstream face of the dam adjacent to the right spillway training wall and reseed with grass.

It is also recommended that the depression at the downstream toe of the dam and the springs observed along the downstream

PARKER DAM

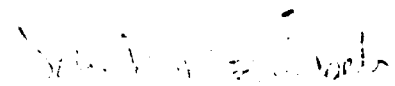
sections of the outlet works discharge channel (described in Section 3.1.c) be monitored and their conditions recorded during future inspections.

In addition, the following operational measures are recommended to be undertaken by the owner:

- 1) Develop a detailed emergency operation and warning system.
- 2) During periods of unusually heavy rainfall, provide around-the-clock surveillance of the dam.
- 3) When warning of a storm of major proportions is given by the National Weather Service, the owner should activate the emergency operation and warning system.

Submitted by:

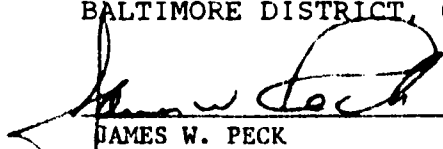
MICHAEL BAKER, JR., INC.


John A. Dziubek, P.E.
Engineering Manager-Geotechnical

Date: 26 August, 1980

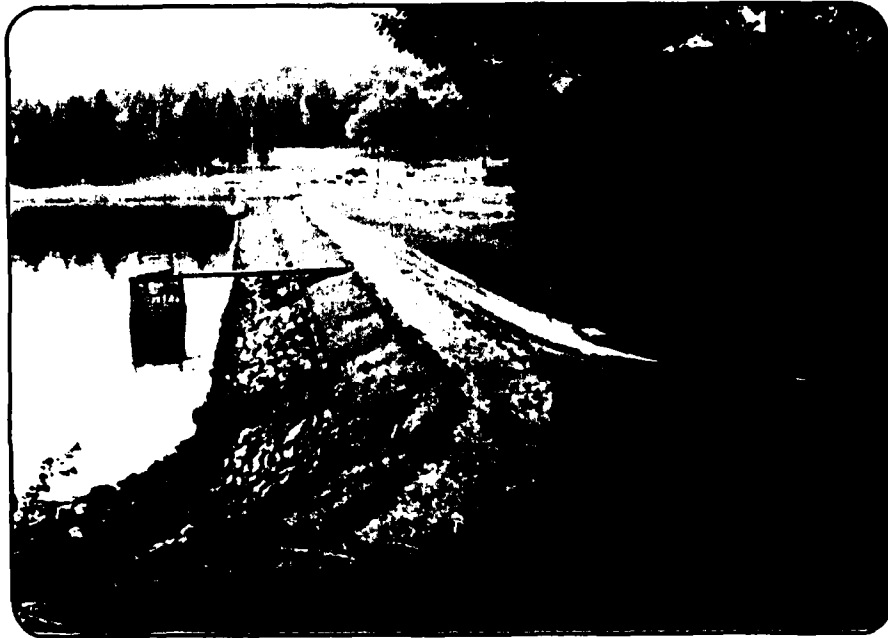
Approved by:

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS


JAMES W. PECK
Colonel, Corps of Engineers
District Engineer

Date: 12 Sep 80

PARKER DAM



Overall View of Dam from Right Abutment



Overall View of Dam from Left Abutment

TABLE OF CONTENTS

	<u>Page</u>
Section 1 - Project Information	1
Section 2 - Engineering Data	7
Section 3 - Visual Inspection	9
Section 4 - Operational Procedures	11
Section 5 - Hydraulic/Hydrologic	12
Section 6 - Structural Stability	13
Section 7 - Assessment, Recommendations/Remedial Measures	14

APPENDICES

Appendix A - Visual Inspection Check List, Field Sketch, Top of Dam Profile, and Typical Cross-Section
Appendix B - Engineering Data Check List
Appendix C - Photograph Location Plan and Photographs
Appendix D - Hydrologic and Hydraulic Computations
Appendix E - Plates
Appendix F - Regional Geology

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
PARKER DAM
NDI No. PA 01126, PennDER No. 17-87

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

- a. Authority - The Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of inspection of dams throughout the United States.
- b. Purpose of Inspection - The purpose of the inspection is to determine if the dam constitutes a hazard to human life or property.

1.2 DESCRIPTION OF PROJECT

- a. Description of Dam and Appurtenances - Parker Dam is a 25 foot high earthfill dam. The total length of the dam is 740 feet. The embankment has a crest width of 10 feet and side slopes of 3H:1V (Horizontal to Vertical) and 2.4H:1V on the upstream and downstream faces of the embankment, respectively. The upstream face of the embankment is protected by 18 inch stone riprap hand placed on a 6 inch bed of crushed rock. This riprap extends from 2 feet below normal pool level to within 2.5 feet of the crest of the dam.

There are two spillways located at the left abutment of the dam; a principal spillway consisting of a concrete ogee weir and an emergency spillway which consists of a broad-crested masonry block weir. The crest of the principal spillway is 110 feet long and is at Elevation 1589.0 feet Mean Sea Level (M.S.L.). The crest of the emergency spillway is 132 feet long and is at Elevation 1590.0 feet M.S.L. The emergency spillway lies immediately to the left of the principal spillway; there is no training wall or other type of division between the two spillway channels. (See field sketch for plan view of spillways).

Both spillways discharge into a masonry-lined discharge channel. For the principal spillway, there is a 5 foot drop from the crest of the spillway weir to the discharge channel. The

channel then extends approximately 53 feet downstream and has a 2 percent slope. At the downstream end of the channel, there is a 10 foot drop to a stilling basin.

For the emergency spillway, there is a 0.6 foot drop from the crest of the spillway weir to the discharge channel. The channel then extends approximately 120 feet downstream and has a 5 percent slope. At the downstream end of the channel, there is a 10 foot drop to the stilling basin.

There is a riprapped approach channel to both the principal and emergency spillways. This channel extends approximately 20 feet upstream from the crest of each spillway and has a mild slope up to the base of each spillway weir.

The outlet works for the dam consist of a 48 inch corrugated metal pipe encased in concrete. The intake to the outlet works (invert Elevation 1575.6 feet M.S.L.) is located at the base of a masonry and concrete tower in the reservoir which is approximately 150 feet from the right abutment. A 24 inch slide gate is located on the intake to the pipe. The total length of the outlet pipe is 80 feet. The elevation of the exit invert of the pipe at the downstream toe of the dam is 1574.6 feet M.S.L.

- b. Location - Parker Dam is located in Huston Township, Clearfield County, Pennsylvania on Laurel Run in the Moshannon State Forest. The coordinates of the dam are N 41° 11.9' and W 78° 30.5'. The dam and reservoir can be located on the USGS 7.5 minute topographic quadrangle, Penfield, Pennsylvania.
- c. Size Classification - The height of the dam is 25 feet and the reservoir volume at the top of the dam is 318 acre-feet. Therefore, the dam is in the "Small" size category.
- d. Hazard Classification - There is a relatively new sewage treatment plant operated by Parker State Park personnel approximately 1000 feet downstream from the dam. Economic damage to this facility and possible loss of life to the operators would result if the dam were to fail. No additional loss of life is believed likely to result from a failure of the dam. Therefore, the dam is considered to be in the "Significant" hazard category.

- e. Ownership - The dam and reservoir are owned by the Commonwealth of Pennsylvania, Department of Environmental Resources (PennDER), Bureau of State Parks, Harrisburg, Pennsylvania.
- f. Purpose of the Dam - The reservoir is used for fishing and other recreational activities.
- g. Design and Construction History - The dam was originally constructed for a lumber operation. There is no information available concerning the original design and construction of Parker Dam. The dam was rebuilt from 1934 to 1935 but developed serious leaks and other problems which required that the reservoir be drained soon after its initial filling. In 1939 and 1940 corrective measures were designed and carried out. Since 1940, some minor repairs have been completed on the spillway and embankment.
- h. Normal Operating Procedures - The reservoir is typically at the crest of the principal spillway, Elevation 1589.0 feet M.S.L. The outlet works are operated once a year. The dam is inspected on a yearly basis by personnel from the Pennsylvania Department of Environmental Resources, Bureau of Dam Safety.

1.3 PERTINENT DATA

a.	<u>Drainage Area (square miles)</u> -	17.9
b.	<u>Discharge at Dam Site (c.f.s.)</u> -	
	Maximum Flood (1972) -	1725
	Spillway Capacity at Minimum Top of Dam (El. 1596.6 ft. M.S.L.) -	14,547
c.	<u>Elevation (feet above M.S.L.)</u> -	
	Design Top of Dam -	Unknown
	Average Top of Dam -	1597.0
	Minimum Top of Dam -	1596.6
	Maximum Design Pool -	Unknown
	Normal Pool -	1589.0
	Crest of Emergency Spillway -	1590.0
	Crest of Principal Spillway -	1589.0
	Outlet Pipe - Invert at Entrance -	1575.6
	Invert at Exit -	1574.6
	Maximum Tailwater -	Unknown
	Streambed at Toe of Dam -	1572+

- d. Reservoir (feet) -
- | | |
|---|------|
| Length of Maximum Pool
(El. 1596.6 ft. M.S.L.) - | 2100 |
| Length of Normal Pool
(El. 1589.0 ft. M.S.L.) - | 1800 |
- e. Storage (acre-feet) -
- | | |
|---|-----|
| Minimum Top of Dam
(El. 1596.6 ft. M.S.L.) - | 318 |
| Normal Pool
(El. 1589.0 ft. M.S.L.) - | 105 |
- f. Reservoir Surface (acres) -
- | | |
|---|----|
| Minimum Top of Dam
(El. 1596.6 ft. M.S.L.) - | 37 |
| Normal Pool
(El. 1589.0 ft. M.S.L.) - | 20 |
- g. Dam -
- | | |
|-----------------------------------|---|
| Type - | Earthfill |
| Length (feet) - | 740 |
| Height (feet) - | 25 |
| Crest Width (feet) - | 10 |
| Side Slopes - Upstream - Design - | 3H:1V |
| Field - | 3H:1V |
| Downstream - Design - | 2H:1V |
| Field - | 2.4H:1V |
| Zoning - | None |
| Impervious Core - | There is evidence from the PennDER File that a stone masonry core wall was built in the center of the dam when it was reconstructed in 1934 through 1935 by the Civilian Conservation Corps, although there are no detailed construction plans of the wall. |
| Cut-off - | There is evidence from the PennDER File that an upstream cut-off trench was constructed when the dam was repaired in 1939 and 1940. Since there are no plans, the extent and size of this trench is unknown. |
| Grout Curtain - | None |
| Drains - | Drains are provided for the spillway discharge channels. One 6 inch tile drain is located on the right side of the outlet works discharge channel immediately downstream from the outlet structure. |

- h. Diversion and Regulating Tunnel - None
- i. Principal Spillway -
- Type - Concrete ogee weir
Length of Crest Perpendicular to
Flow (feet) - 110
Crest Elevation (feet M.S.L.) - 1589.0
Gates - None
Upstream Channel - A mildly sloping riprapped approach channel extending 20 feet upstream from the weir.
Downstream Channel - A masonry-lined discharge channel with a 2 percent slope extends 53 feet downstream from the crest of the weir. There is a 5 foot drop from the crest of the weir to the channel. There is a 10 foot drop to a stilling basin at the downstream end of the channel.
- j. Emergency Spillway -
- Type - Masonry block broad-crested weir
Length of Crest Perpendicular to
Flow (feet) - 132
Width of Crest Parallel to
Flow (feet) - 2
Crest Elevation (feet M.S.L.) - 1590.0
Gates - None
Upstream Channel - A mildly sloping riprapped approach channel extending 20 feet upstream from the weir.
Downstream Channel - A masonry-lined discharge channel with a 5 percent slope extends 120 feet downstream from the crest of the weir. There is a 0.6 foot drop from the crest of the weir to the discharge channel. There is a 10 foot drop to the stilling basin at the downstream end of the channel.
- k. Regulating Outlets - The outlet works for the dam consist of a 48 inch corrugated metal pipe encased in concrete. The intake to the outlet works is located at the base of a masonry and concrete tower in the reservoir (invert Elevation 1575.6 ft. M.S.L.) which is approximately 150 feet from the right abutment. A 24 inch slide gate is located on the

intake to the pipe. The total length of the outlet pipe is 80 feet. The elevation of the exit invert of the pipe at the downstream toe of the dam is 1574.6 feet M.S.L.

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

The review of information for this dam included PennDER File No. 17-87. The following information is contained in the file for this dam.

- 1) Information concerning reconstruction of Parker Dam dated 18 July 1933 to 27 May 1935 including agency applications and permits, construction memorandums, progress reports, material and manpower information, sketches and copies of photographs, and miscellaneous correspondence.
- 2) Information concerning repairs required for Parker Dam dated 22 September 1937 to 13 May 1940 including inspection reports, construction memorandums, progress reports, material and manpower estimates, soil and soil test data, sketches, and miscellaneous correspondence.
- 3) Inspection Reports, including inspection instructions, from 27 July 1944 to 28 September 1978.
- 4) Information concerning minor repairs to the dam from 24 May 1943 to 30 August 1979 including material and manpower estimates, sketches, drawdown applications, and pertinent correspondence.
- 5) Miscellaneous correspondence.

2.2 CONSTRUCTION

There is no information available concerning the original design and construction of Parker Dam which was used for lumbering purposes. In 1933, the Department of Forests and Waters decided to build a new dam on the site of the original dam. Using Civilian Conservation Corps labor, construction began in the summer of 1933 and was completed in the spring of 1935. This dam was built with little or no design work and consequently developed leaks and other problems soon after the reservoir was filled. These problems were apparently severe enough to require that the reservoir be drained within a year after its initial filling. In 1939, the Department of Forests and Waters designed corrections

for the dam. Although there is considerable correspondence concerning plans and specifications in the PennDER File, there is no design information or construction plans available. In the spring of 1940, repair of the dam was completed by the Civilian Conservation Corps. A 6 inch tile drain and pea gravel filter was installed on the right downstream end of the outlet structure in 1952. This filter and drain were installed to relieve seepage (springs) from this area.

2.3 OPERATION

No formal records are available for operation of the reservoir. The spillways are uncontrolled and the reservoir is typically at or near the elevation of the principal spillway crest. The gate for the outlet works is opened and checked once a year.

2.4 EVALUATION

- a. Availability - The information reviewed is readily available from the PennDER File No. 17-87 on the dam.
- b. Adequacy - The information available is adequate for a Phase I Inspection of this dam.
- c. Validity - At the present time there is no reason to doubt the authenticity of the available engineering data.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

- a. General - The visual inspection of Parker Dam was performed on 25 June 1980. The pool at the time of inspection was at Elevation 1589.1 feet M.S.L. or approximately 0.1 feet above normal pool level. The dam and appurtenant structures were found to be in good overall condition at the time of the inspection. Noteworthy deficiencies observed are described briefly in the following paragraphs. The complete visual inspection check list, field sketch, top of dam profile, and typical cross-section are presented in Appendix A.
- b. Embankment - The following is a list of the observations made during the visual inspection of the embankment.
 - 1) There is a small (approximately 5 foot wide by 5 foot long by 1 foot deep) depression in the downstream toe of the embankment immediately to the right of the outlet works.
 - 2) There is an animal burrow on the downstream face of the embankment immediately to the left of the outlet structure.
 - 3) There are several other animal burrows on the downstream face of the embankment approximately 10 feet to the right of the outlet works.
 - 4) The crest and upstream face of the embankment adjacent to the right spillway training wall are low.
- c. Appurtenant Structures - Both spillways and discharge channels were in good condition. The outlet conduit, outlet works tower, and gate were also in good condition.

Two small springs were observed along the downstream sections of the outlet works discharge channel. The first of these was approximately 25 feet downstream from the outlet works and was flowing approximately 1 g.p.m. The second was 75 feet further downstream and was flowing approximately 2 g.p.m. These springs appear to be the result of groundwater flow and not seepage through the dam foundation.

- d. Reservoir Area - The slopes of the reservoir and watershed area are moderate and are predominantly covered with forests and park areas. Sedimentation has only been a significant problem in the upper reaches of the reservoir. Overall, sedimentation has not presented a serious problem in the impoundment.

There is a 6 foot high by 8 foot wide corrugated metal pipe arch culvert in the upper reservoir area. This pipe carries flow from a portion of the watershed under a park road. A small pond lies in a low area at the upstream end of this culvert.

- e. Downstream Channel - The downstream channel is riprapped with large boulders for 50 feet downstream of the stilling basin. The channel is clear of obstructions and debris. The channel slopes are moderate. There is a relatively new sewage treatment plant approximately 1000 feet downstream from the dam. Downstream from the sewage treatment plant, the channel is moderately sloped, and free from obstructions. The channel passes through a relatively wide valley and there are no additional structures downstream which would be affected by a failure of the dam.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

There are no formal, written procedures to be followed in the event of an impending failure of the dam. Since the park superintendent's office is located near the left abutment of the dam, the spillway and embankment are usually given a quick visual inspection every day. The dam is inspected on a yearly basis by personnel from the Pennsylvania Department of Environmental Resources, Bureau of Dam Safety.

4.2 MAINTENANCE

Parker Dam State Park personnel perform most of the routine maintenance for the dam. PennDER is responsible for major repairs to the dam. During the yearly inspections of the dam, formal inspection procedures are followed to determine necessary maintenance. At the present time maintenance of the dam is considered to be adequate.

4.3 MAINTENANCE OF OPERATING FACILITIES

The outlet works are operated once a year by Parker State Park personnel. The condition of these facilities is also checked during the yearly dam inspections. At the present time, maintenance of the operating facilities is considered to be adequate.

4.4 DESCRIPTION OF ANY WARNING SYSTEM IN EFFECT

There is no warning system or evacuation plan in the event of a dam failure. Formal emergency procedures should be developed and implemented.

4.5 EVALUATION OF OPERATIONAL ADEQUACY

Operational and maintenance procedures are considered to be adequate at this time. Formal emergency procedures should be developed and implemented.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 EVALUATION OF FEATURES

- a. Design Data - No hydraulic or hydrologic design calculations are available for Parker Dam.
- b. Experience Data - The maximum flood of record at the dam site occurred during Tropical Storm Agnes in 1972. Flow in the spillway was 1.2 feet above the emergency spillway crest. This corresponds to a discharge of 1725 c.f.s.
- c. Visual Observations - No problems, which would indicate that the dam and appurtenant structures could not perform satisfactorily during a flood event, were observed during the inspection.
- d. Overtopping Potential - Parker Dam is a "Small" size - "Significant" hazard dam requiring evaluation for a spillway design flood (SDF) in the range of the 100-year flood to the 1/2 Probable Maximum Flood (1/2 PMF). Since the dam is in the middle of the "Small" size category according to storage capacity, the 1/2 PMF was selected as the SDF.

The hydraulic capacity of the dam, reservoir, and spillways was assessed by utilizing the U.S. Army Corps of Engineers Flood Hydrograph Package, HEC-1 DB. The hydrologic characteristics of the drainage basin, specifically, the Snyder's unit hydrograph parameters, were obtained from a regionalized analysis conducted by the Baltimore District of the U.S. Army Corps of Engineers.

The analysis revealed that the maximum inflow to the impoundment during the 1/2 PMF is 10,205 c.f.s. The capacity of the principal and emergency spillways at the minimum top of dam elevation is 14,547 c.f.s. Therefore, because the available spillway capacity exceeds the maximum inflow to the reservoir during the SDF, the dam and spillways can safely pass the SDF.

- e. Spillway Adequacy - As outlined above, the spillway capacity is much greater than that required to pass the SDF. The spillways are therefore considered to be "adequate".

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

- a. Visual Observations - The seepage (springs) along the downstream section of the outlet works discharge channel appears to be the result of groundwater flow and not seepage through the dam foundation. The small depression at the downstream toe of the embankment noted in Section 3.1.b(1) also does not appear to be a significant problem at this time. Both the springs and the depression should be monitored during future inspections to ensure that these conditions do not become serious problems.
- b. Design and Construction Data - Calculations of structural stability for the embankment were not available for review. No detailed information concerning the dam foundation materials or conditions was available. It is estimated that, given the satisfactory performance of the embankment slopes since its last major repairs in 1940, further assessments of the embankment slope stability are not necessary. However, should future inspections observe signs of distress or seepage, further evaluations may become necessary.
- c. Operating Records - Nothing in the available operating records indicates the need for concern relative to the structural stability of the dam.
- d. Post-Construction Changes - No changes adversely affecting the structural stability of the dam have been performed.
- e. Seismic Stability - The dam is located in Seismic Zone 1 of the "Seismic Zone Map of the Contiguous United States", Figure 1, page D-30, "Recommended Guidelines for Safety Inspections of Dams." This is a zone of minor seismic activity. Therefore, further consideration of the seismic stability is not warranted.

SECTION 7 - ASSESSMENT, RECOMMENDATIONS/REMEDIAL MEASURES

7.1 DAM ASSESSMENT

- a. Safety - Parker Dam was found to be in good overall condition at the time of the inspection. Parker Dam is a "Significant" hazard - "Small" size dam requiring evaluation for an SDF in the range of the 100-year flood to the 1/2 PMF. Since the dam is in the middle of the "Small" size category according to storage capacity, the 1/2 PMF was selected as the SDF. As presented in Section 5, the available spillway capacity is much greater than the maximum flow expected during the SDF. Therefore, the dam and spillways can safely pass the required SDF and are considered to be "adequate".
- b. Adequacy of Information - The information available and observations and measurements made during the visual inspection are considered to be adequate for a Phase I Inspection Report.
- c. Urgency - The owner should immediately initiate the actions discussed in paragraph 7.2.
- d. Necessity for Additional Data/Evaluation - No further investigations are deemed to be necessary at this time.

7.2 RECOMMENDATIONS/REMEDIAL MEASURES

The inspection revealed certain items of remedial work which should be performed immediately by the owner of the dam. These include:

- 1) Fill the depression in the downstream toe of the embankment immediately to the right of the outlet works.
- 2) Fill the animal burrows on the downstream face of the embankment immediately to the left of the outlet works and approximately 10 feet to the right of the outlet works.
- 3) Fill the low area on the crest and upstream face of the dam adjacent to the right spillway training wall and reseed with grass.

It is also recommended that the depression at the downstream toe of the dam and the springs observed

along the downstream sections of the outlet works discharge channel (described in Section 3.1.c) be monitored and their conditions recorded during future inspections.

In addition, the following operational measures are recommended to be undertaken by the owner:

- 1) Develop a detailed emergency operation and warning system.
- 2) During periods of unusually heavy rainfall, provide around-the-clock surveillance of the dam.
- 3) When warning of a storm of major proportions is given by the National Weather Service, the owner should activate the emergency operation and warning system.

APPENDIX A

VISUAL INSPECTION CHECK LIST, FIELD SKETCH,
TOP OF DAM PROFILE, AND TYPICAL CROSS-SECTION

Check List
Visual Inspection
Phase 1

Name of Dam Parker Dam County Clearfield State PA Coordinates Lat. N 41°11.9'
 NDI # PA 01126 Long. W 78°30.5'
 PennDER # 17-87
 Date of Inspection 25 June 1980 Weather Clear Temperature 80° F.

Pool Elevation at Time of Inspection 1589.1 ft.* M.S.L. Tailwater at Time of Inspection 1571.8 ft.* M.S.L.

*All elevations are referenced to the crest of the ogee spillway, El. 1589.0 ft. M.S.L., as determined from design plans for the dam.

Inspection Personnel:

Michael Baker, Jr., Inc.:

James G. Ulinski
 Wayne D. Lasch
 Cliff E. Guindon

Owner's Representatives:

H. Scott Streater, Park
 Superintendent
 Parker State Park

James G. Ulinski Recorder

CONCRETE/MASONRY DAMS - Not Applicable

Name of Dam: PARKER DAM
 NDI # PA 01126

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
-----------------------	--------------	----------------------------

LEAKAGE

STRUCTURE TO
 ABUTMENT/EMBANKMENT
 JUNCTIONS

DRAINS

WATER PASSAGES

FOUNDATION

CONCRETE/MASONRY DAMS - Not Applicable

Name of Dam: PARKER DAM
 NDI # PA 01126

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES		
STRUCTURAL CRACKING		
VERTICAL AND HORIZONTAL ALIGNMENT		
MONOLITH JOINTS		
CONSTRUCTION JOINTS		

EMBANKMENT

Name of Dam PARKER DAM
 NDI # PA 01126

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None observed	

UNUSUAL MOVEMENT OR
 CRACKING AT OR BEYOND
 THE TOE

There is a depressed area in the downstream toe of the embankment immediately to the right of the outlet works. The area is approximately 5 ft. wide by 5 ft. long by 1 ft. deep.

This area should be filled. It should be monitored during future inspections.

SLOUGHING OR EROSION OF
 EMBANKMENT AND ABUTMENT
 SLOPES

None were observed. The embankment and abutment slopes were in good condition. There is an animal burrow on the downstream face of the embankment immediately to the left of the outlet structure. There are also several other animal burrows approximately 10 ft. to the right of the outlet structure.

The animal burrows should be filled.

EMBANKMENT

Name of Dam PARKER DAM
NDI # PA 01126

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	There is a low area on the crest and upstream slope of the dam adjacent to the right spillway training wall.	This area should be filled.

RIPRAP FAILURES

None were observed. The riprap on the up-
stream face of the dam and in the spill-
way discharge channel was in good condi-
tion.

VEGETATION

A well-maintained cover of grass is
growing on the entire embankment.

EMBANKMENT

Name of Dam PARKER DAM
 NDI # PA 01126

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	There is a low area on the crest and the upstream face of the dam adjacent to the right spillway training wall.	This area should be filled.
ANY NOTICEABLE SEEPAGE	No seepage on the embankment or abutments was observed. There are two small springs along the outlet channel; one, flowing approximately 1 g.p.m., was 25 ft. downstream from the downstream end of the outlet works, and another, flowing 2 g.p.m., approximately 100 ft. downstream from the downstream end of the outlet works.	These springs appear to be the result of groundwater flow from the hillside above the right abutment of the channel and not from seepage through the dam foundation.
STAFF GAGE AND RECORDER	A staff gauge is mounted on the right spillway training wall above the crest of the ogee weir. The gauge is marked in 0.1 ft. increments from the crest of the weir (El. 1589.0 ft. M.S.L.) to the top of the dam (El. 1597.0 ft. M.S.L.).	No formal records of reservoir levels are maintained.
DRAINS	A 6 in. tile drain on the right side and slightly downstream of the outlet structure was not flowing. Most of the drains for the spillway structure were not flowing. Some flow (est. 2 g.p.m.) was flowing from the drains for the emergency spillway discharge channel immediately to the left of the principal discharge channel.	

OUTLET WORKS

Name of Dam: PARKER DAMNDI # PA 01126

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
-----------------------	--------------	----------------------------

CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	The outlet conduit is a 48 in. C.M.P. encased in concrete. The pipe was in good condition.	
--	--	--

INTAKE STRUCTURE	The intake for the outlet works is located in a masonry and concrete tower in the reservoir. The tower is approximately 150 ft. from the right abutment. The tower appeared to be in good condition.	
------------------	---	--

OUTLET STRUCTURE	The outlet structure was in good overall condition.	
------------------	--	--

OUTLET CHANNEL	The outlet channel is a narrow earth and rock channel. The channel banks are covered with a thick stand of trees but the channel is relatively clear of obstructions.	
----------------	---	--

EMERGENCY GATE	There is a 24 in. slide gate at the upstream end of the outlet works. The gate is in good condition.	
----------------	--	--

PRINCIPAL SPILLWAY

Name of Dam: PARKER DAM
 NDI # PA 01126

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	The principal spillway weir is a concrete, ogee weir with an inclined upstream face. The concrete surfaces are in good condition.	
APPROACH CHANNEL	There is a riprapped approach channel. This channel extends approximately 20 ft. upstream from the spillway crest and has a mild slope up to the base of the weir.	
DISCHARGE CHANNEL	There is a masonry-lined discharge channel with a 2% slope extending approximately 53 ft. downstream from the crest of the weir. There is a 5 ft. drop from the crest of the weir to the discharge channel. At the downstream end of the channel, there is a 10 ft. drop to a stilling basin. The channel was in good condition.	
BRIDGE AND PIERS	None	
GATES AND OPERATION EQUIPMENT	None	

EMERGENCY SPILLWAY

Name of Dam: PARKER DAM
 NDI # PA 01126

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MASONRY WEIR	The emergency spillway is located adjacent to the principal spillway. The crest of this spillway is approximately 1 ft. above the crest of the principal spillway. The emergency spillway weir is a broad crested masonry weir. The weir is in good condition.	
APPROACH CHANNEL	There is a riprapped approach channel to the emergency spillway which extends 20 ft. upstream into the reservoir. The approach channel has a mild slope up to the base of the weir.	
DISCHARGE CHANNEL	There is a masonry discharge channel with a 5% slope which extends 120 ft. downstream from the crest of the emergency spillway. There is a 0.6 ft. drop from the crest of the weir to this discharge channel. At the downstream end of the channel, there is a 10 ft. drop to a stilling basin. The channel was in good condition.	
BRIDGE AND PIERS	None	
GATES AND OPERATION EQUIPMENT	None	

INSTRUMENTATION

Name of Dam: PARKER DAM
 NDI # PA 01126

VISUAL EXAMINATION	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	There is a high water mark chiseled on the left spillway training wall to mark the spillway level reached during the Agnes flood (1972). This mark is 1.2 ft. above the crest of the emergency spillway.	

OBSERVATION WELLS

None

WEIRS

None

PIEZOMETERS

None

OTHER

None

RESERVOIR

Name of Dam: PARKER DAM
 NDI # PA 01126

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
-----------------------	--------------	----------------------------

SLOPES

The slopes of the reservoir area are moderate.
 The watershed is covered predominantly with
 forests and park areas.

SEDIMENTATION

Sedimentation has only been a significant
 problem in the upper reaches of the reservoir.
 Overall, sedimentation has not presented a
 serious problem in the impoundment.

DOWNSTREAM CHANNEL

Name of Dam: PARKER DAM
 NDI # PA 01126

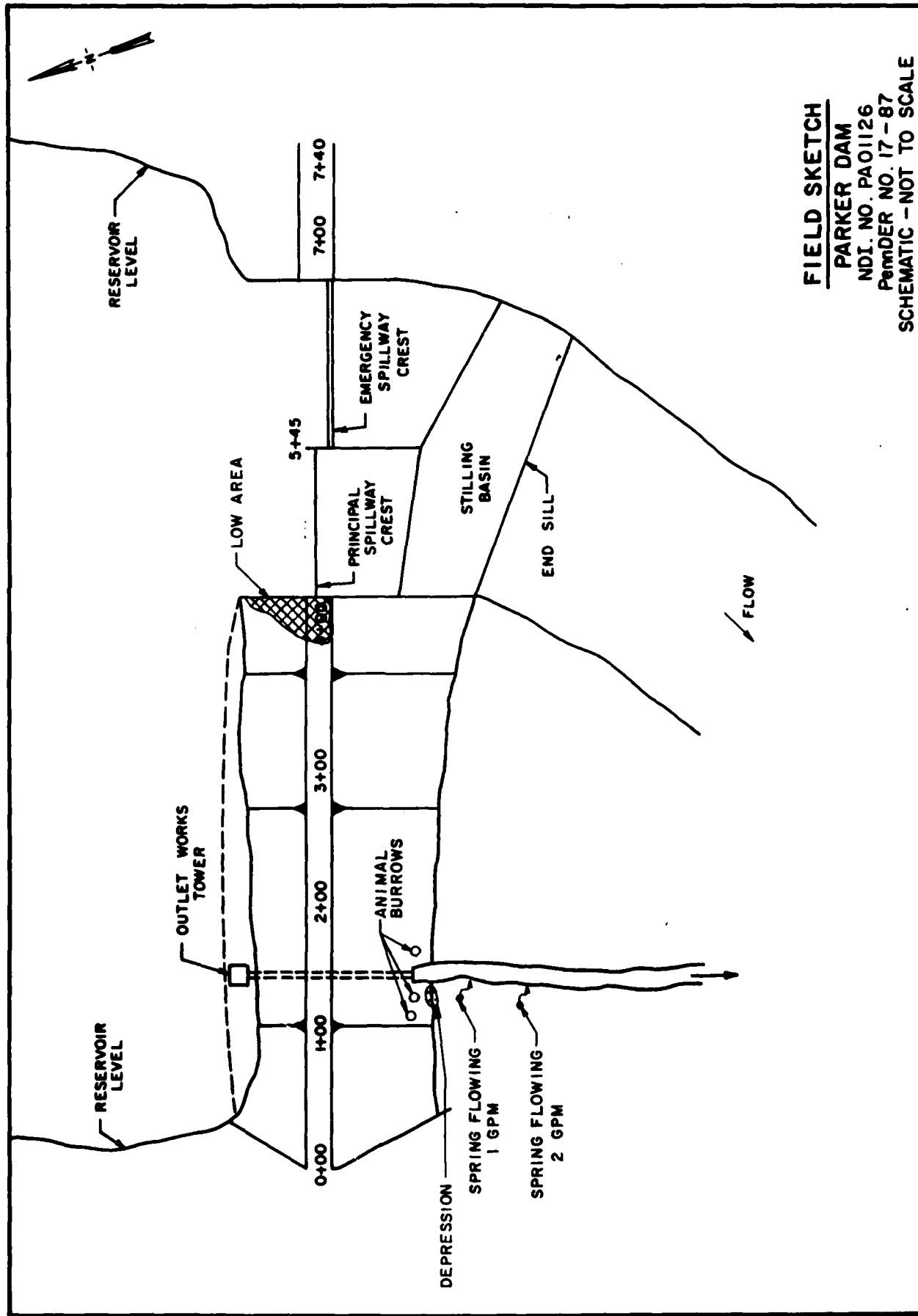
VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	The downstream channel is ripped with large boulders for 50 ft. downstream from the stilling basin. The channel is clear of obstructions and debris.	

SLOPES

The slope of the downstream channel is moderate.

 APPROXIMATE NO.
 OF HOMES AND
 POPULATION

There is a relatively new sewage treatment plant operated by Parker State Park personnel approximately 1000 ft. downstream from the dam. Economic damage to this facility would result if the dam were to fail.



FIELD SKETCH

PARKER DAM

NDI. NO. PA01126

Permit NO. 17-87

SCHEMATIC - NOT TO SCALE

MICHAEL BAKER, JR., INC.

THE BAKER ENGINEERS

8 July 1980

Box 280

Beaver, Pa. 15009

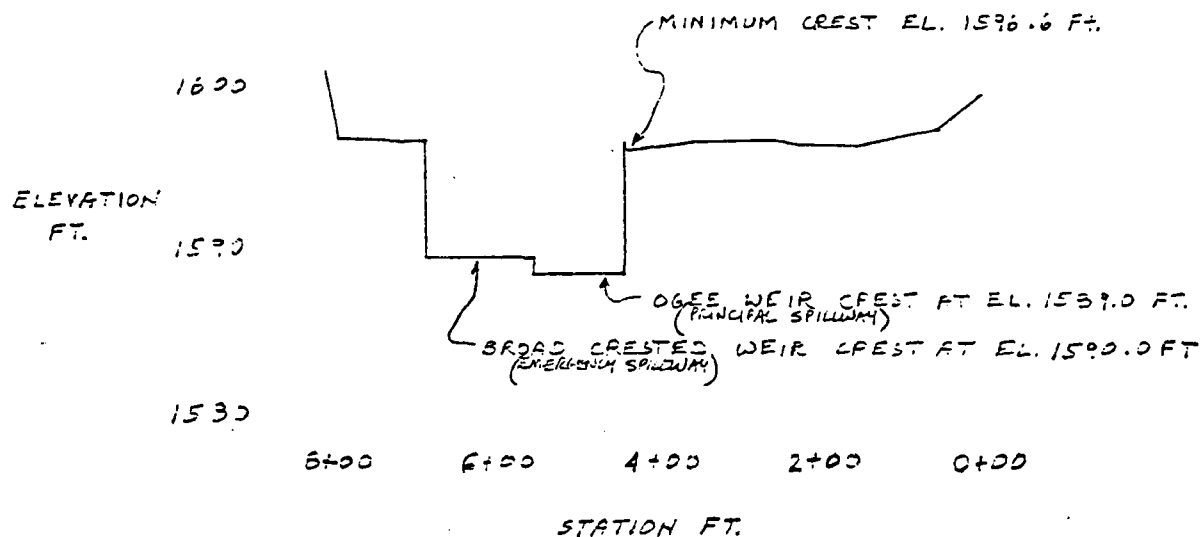
A-14

PARKER DAM

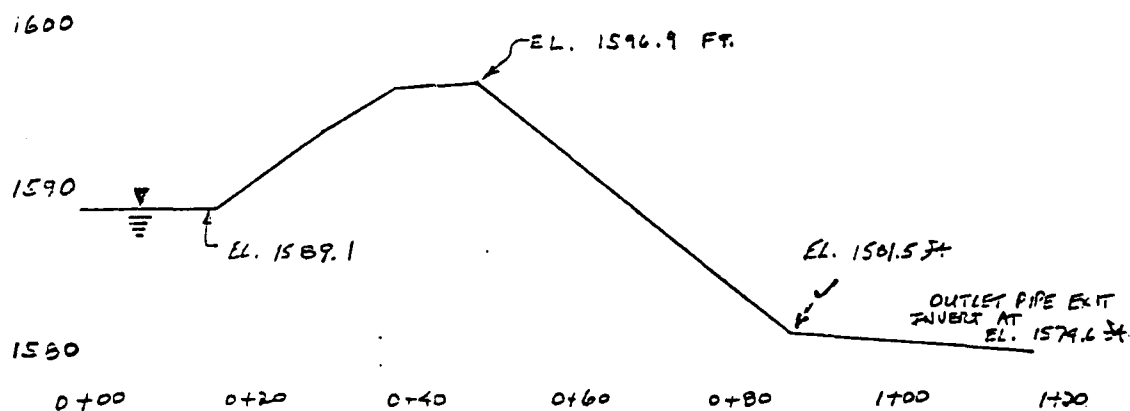
TOP OF DAM PROFILE
AND
TYPICAL CROSS-SECTION

DATE OF INSPECTION - 25 June 1980

TOP OF DAM PROFILE



CROSS SECTION AT STATION 1+54



APPENDIX B

ENGINEERING DATA CHECK LIST

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION

Name of Dam: PARKER DAM
NDI # PA 01126

ITEM	REMARKS
PLAN OF DAM	No plan of the dam was available. See field sketch included in this report for plan view of dam.
REGIONAL VICINITY MAP	The Penfield, PA 7.5 minute USGS topographic quadrangle was used to prepare the location map included as Plate 1 in this report.
CONSTRUCTION HISTORY	Refer to Section 2 of this report.
TYPICAL SECTIONS OF DAM	See Plate 3 of this report.
HYDROLOGIC/HYDRAULIC DATA	No design information is available.
OUTLETS - PLAN, DETAILS, and CONSTRAINTS	See Plate 3.
- DISCHARGE RATINGS	None available
RAINFALL/RESERVOIR RECORDS	Reservoir records are not maintained on a regular basis. Rainfall records are available at the sewage treatment plant downstream from the dam.

Name of Dam: PARKER DAM

NDI # PA 01126

B-2

ITEM	REMARKS
DESIGN REPORTS	No design reports are available.
GEOLOGY REPORTS	No geology reports are available. The regional geology is presented as Appendix F in this report.
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	No information is available.
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	No detailed information is available. Six test pits were excavated prior to the repairs in 1939 and 1940, however, location and detail information is not available.
POST-CONSTRUCTION SURVEYS OF DAM	None
BORROW SOURCES	No detailed information available

Name of Dam: PARKER DAM
NDI # PA 01126

B-3

ITEM	REMARKS
------	---------

MONITORING SYSTEMS

None

MODIFICATIONS

Refer to Section 2 of this report.

HIGH POOL RECORDS

The highest pool level of record was reached in 1972 and was 1.2 ft. above the crest of the emergency spillway.

POST-CONSTRUCTION ENGINEERING
STUDIES AND REPORTS

None

PRIOR ACCIDENTS OR FAILURE OF DAM
DESCRIPTION
REPORTS

None

MAINTENANCE
OPERATION
RECORDS

No records are maintained.

Name of Dam: PARKER DAM B-4
NDI # PA 01126

ITEM	REMARKS
------	---------

SPILLWAY PLAN, SECTIONS, and DETAILS	A schematic of the spillway is included in Appendix D.
OPERATING EQUIPMENT PLANS & DETAILS	See Plate 3.

CHECK LIST
HYDROLOGIC AND HYDRAULIC DATA
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 17.9 sq.mi. (primarily forest and
park areas)

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 1589.0 ft. M.S.L.
(105.3 ac.-ft.)

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): 1596.6 ft. M.S.L.
(317.5 ac.-ft.)

ELEVATION MAXIMUM DESIGN POOL: Unknown

ELEVATION TOP DAM: 1596.6 ft. M.S.L. (minimum)

SPILLWAY:

- a. Crest Elevation Emergency: 1590.0 ft. M.S.L.; Principal:
1589.0 ft. M.S.L.
- b. Type Emergency: broad-crested weir; Principal: ogee weir
- c. Width of Crest Parallel to Flow Emergency: 2 ft.
Principal: ogee crest shape
- d. Length of Crest Perpendicular to Flow Emergency: 132 ft.
Principal: 110 ft.
- e. Location Spillover Left abutment
- f. Number and Type of Gates None

OUTLET WORKS:

- a. Type 48 in. C.M.P. encased in concrete
- b. Location 150 ft. from right abutment
- c. Entrance Inverts 1575.6 ft. M.S.L.
- d. Exit Inverts 1574.6 ft. M.S.L.
- e. Emergency Drawdown Facilities The outlet works can serve as
drawdown facilities

HYDROMETEOROLOGICAL GAGES:

- a. Type Rain gauge
- b. Location At sewage treatment downstream from dam
- c. Records Available on daily basis for past 10 yrs.

MAXIMUM NON-DAMAGING DISCHARGE 1725 c.f.s.

APPENDIX C

PHOTOGRAPH LOCATION PLAN AND PHOTOGRAPHS

DETAILED PHOTOGRAPH DESCRIPTIONS

Overall View of Dam

Top Photo - Overall View of Dam from Right Abutment
(OV-T)

Bottom Photo - Overall View of Dam from Left Abutment
(OV-B)

Photograph Location Plan

Photo 1 - View of Spillway from Right Spillway Training
Wall

Photo 2 - View of Spillway Discharge Channel

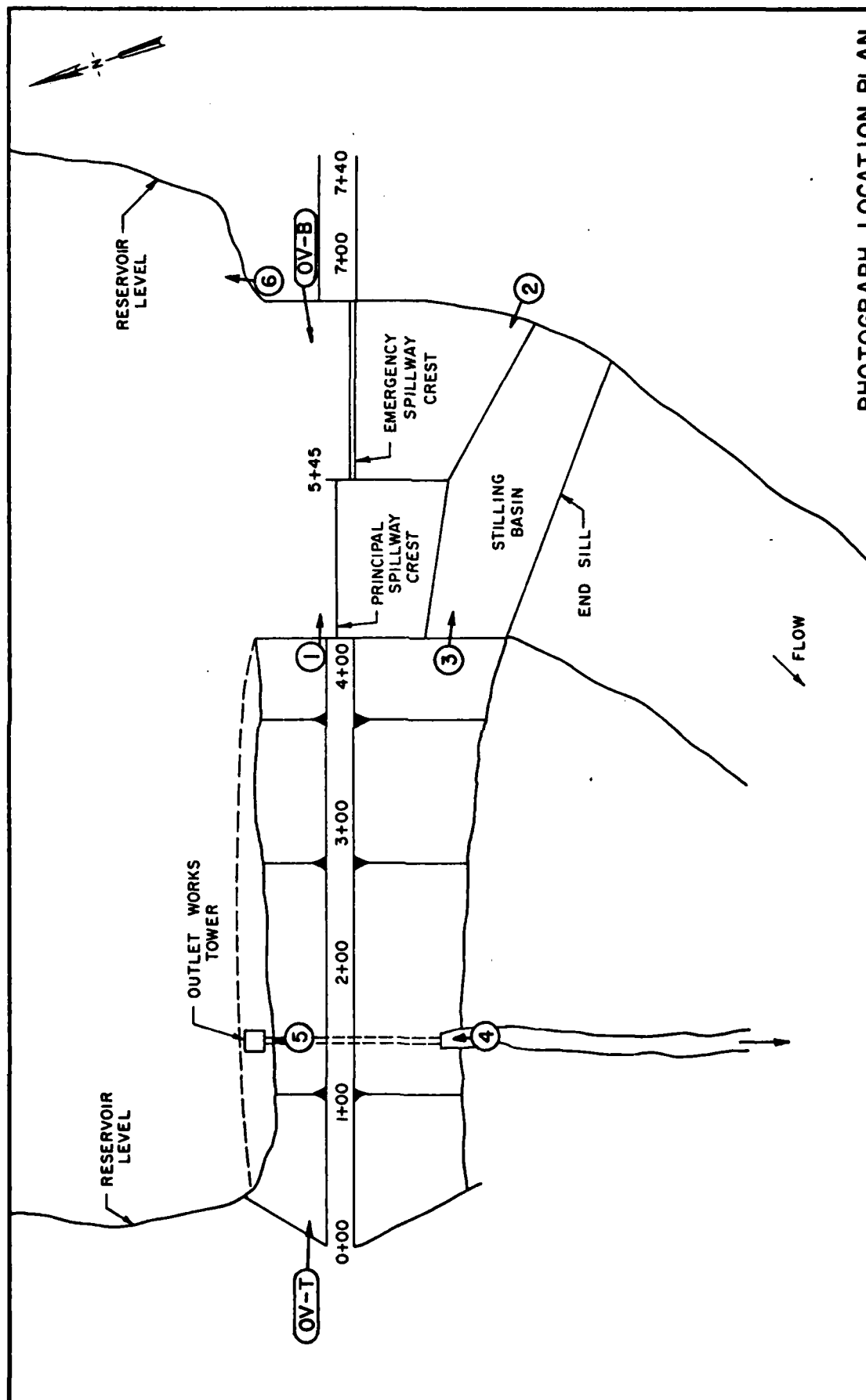
Photo 3 - View of Stilling Basin

Photo 4 - View of Downstream End of Outlet Pipe

Photo 5 - View of Gate at Upstream End of Outlet Pipe
(Taken inside the outlet pipe)

Photo 6 - View of Reservoir and Culvert in Upstream Portion
of Reservoir

Note: Photographs were taken 25 June 1980.



PHOTOGRAPH LOCATION PLAN

PARKER DAM

NDI. NO. PA01126

PennDER NO. 17-87

SCHEMATIC - NOT TO SCALE

PARKER DAM

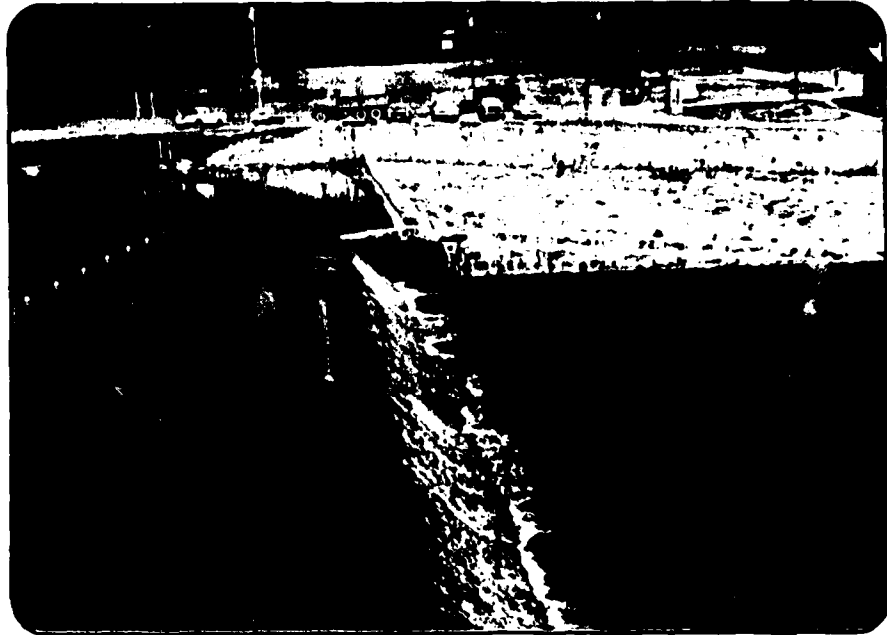


PHOTO 1. View of Spillway from Right Spillway Training Wall



PHOTO 2. View of Spillway Discharge Channel

PARKER DAM

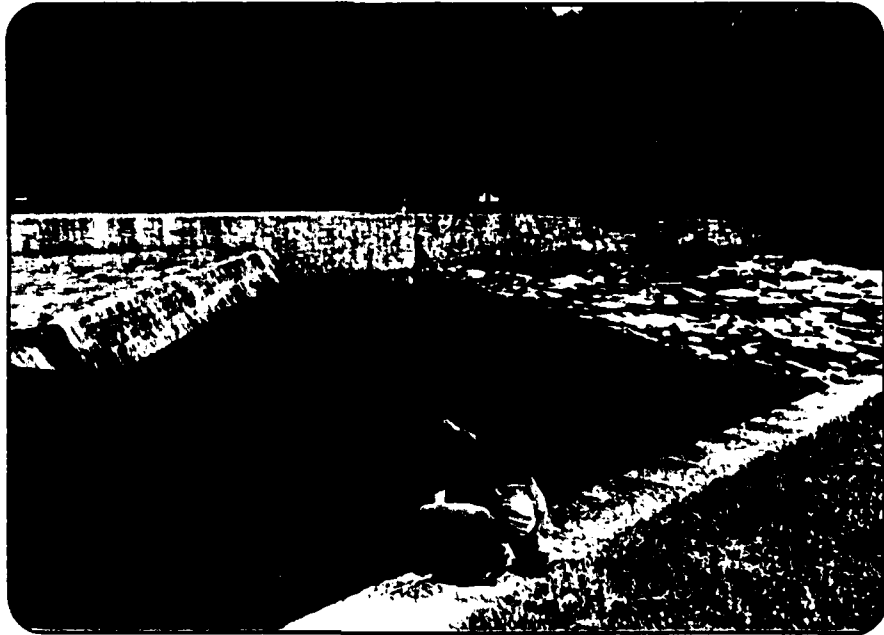


PHOTO 3. View of Stilling Basin

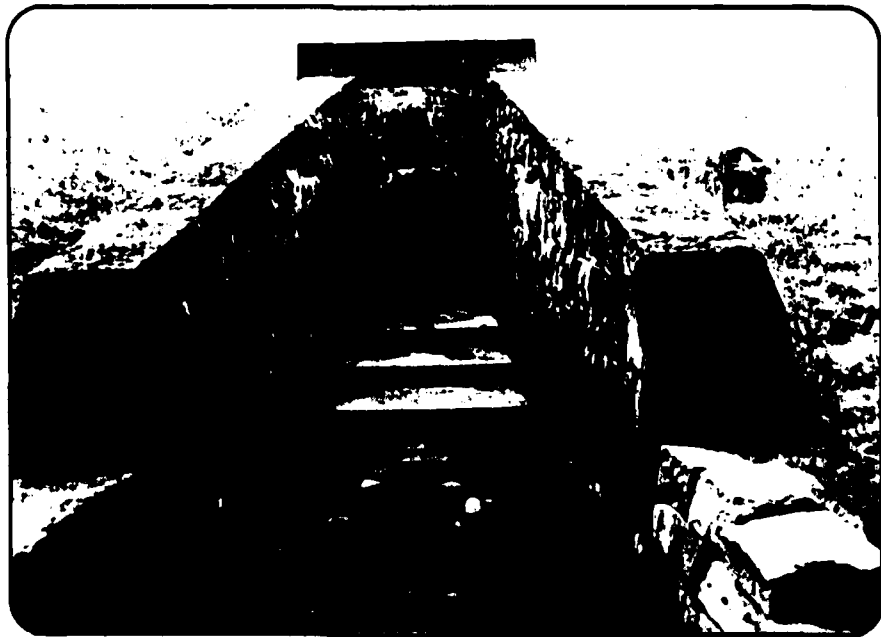


PHOTO 4. View of Downstream End of Outlet Pipe

PARKER DAM



**PHOTO 5. View of Gate at Upstream End of Outlet Pipe
(Taken inside outlet pipe)**

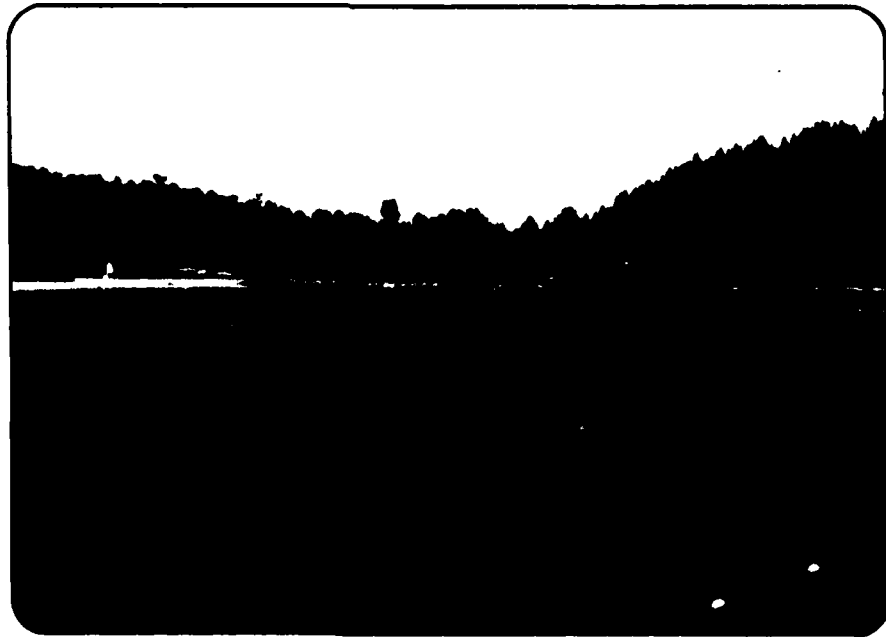


PHOTO 6. View of Reservoir and Culvert in Upstream Portion of Reservoir

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

MICHAEL BAKER, JR., INC.

THE BAKER ENGINEERS

Box 280
Beaver, Pa. 15009

Subject PARKER DAM S.O. No. _____
APPENDIX D - HYDROLOGIC AND Sheet No. _____ of _____
HYDRAULIC CALCULATIONS Drawing No. _____
Computed by _____ Checked by _____ Date _____

TABLE OF CONTENTS

<u>SUBJECT</u>	<u>PAGE</u>
PREFACE	i
HYDROLOGY AND HYDRAULIC DATA BASE	1
DRAINAGE AREA MAP	2
SPILLWAY CONFIGURATIONS	3
TOP OF DAM PROFILE AND TYPICAL CROSS - SECTION	4
HYDRAULIC DATA	5
SPILLWAY DISCHARGE RATINGS	6
HEC-1 DB RESERVOIR INFLOW ANALYSIS	7

PREFACE

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

The conclusions presented herein pertain to present conditions, and the effect of future development on the hydrology has not been considered.

HYDROLOGY AND HYDRAULIC ANALYSIS
DATA BASE

NAME OF DAM: PARKER DAM

PROBABLE MAXIMUM PRECIPITATION (PMP) = 23.1 INCHES/24 HOURS⁽¹⁾

STATION	1	2	3	4	5
Station Description	PARKER DAM				
Drainage Area (square miles)	17.92				
Cumulative Drainage Area (square miles)	17.92				
Adjustment of PMF for Drainage Area (%) ⁽²⁾	Zone 2				
6 Hours	110				
12 Hours	120				
24 Hours	133				
48 Hours	144				
72 Hours	--				
Snyder Hydrograph Parameters					
Zone ⁽³⁾	19				
C_p/C_t ⁽⁴⁾	0.45/1.84				
L (miles) ⁽⁵⁾	8.22				
L_{ca} (miles) ⁽⁵⁾	3.48				
$t_p = C_t (L \cdot L_{ca})^{0.3}$ (hours)	5.03				
Spillway Data					
Crest Length (ft)	(Spillways described on sheets 3, 4, and 6)				
Freeboard (ft)					
Discharge Coefficient					
Exponent					

⁽¹⁾ Hydrometeorological Report 33 (Figure 1), U.S. Army, Corps of Engineers, 1956.

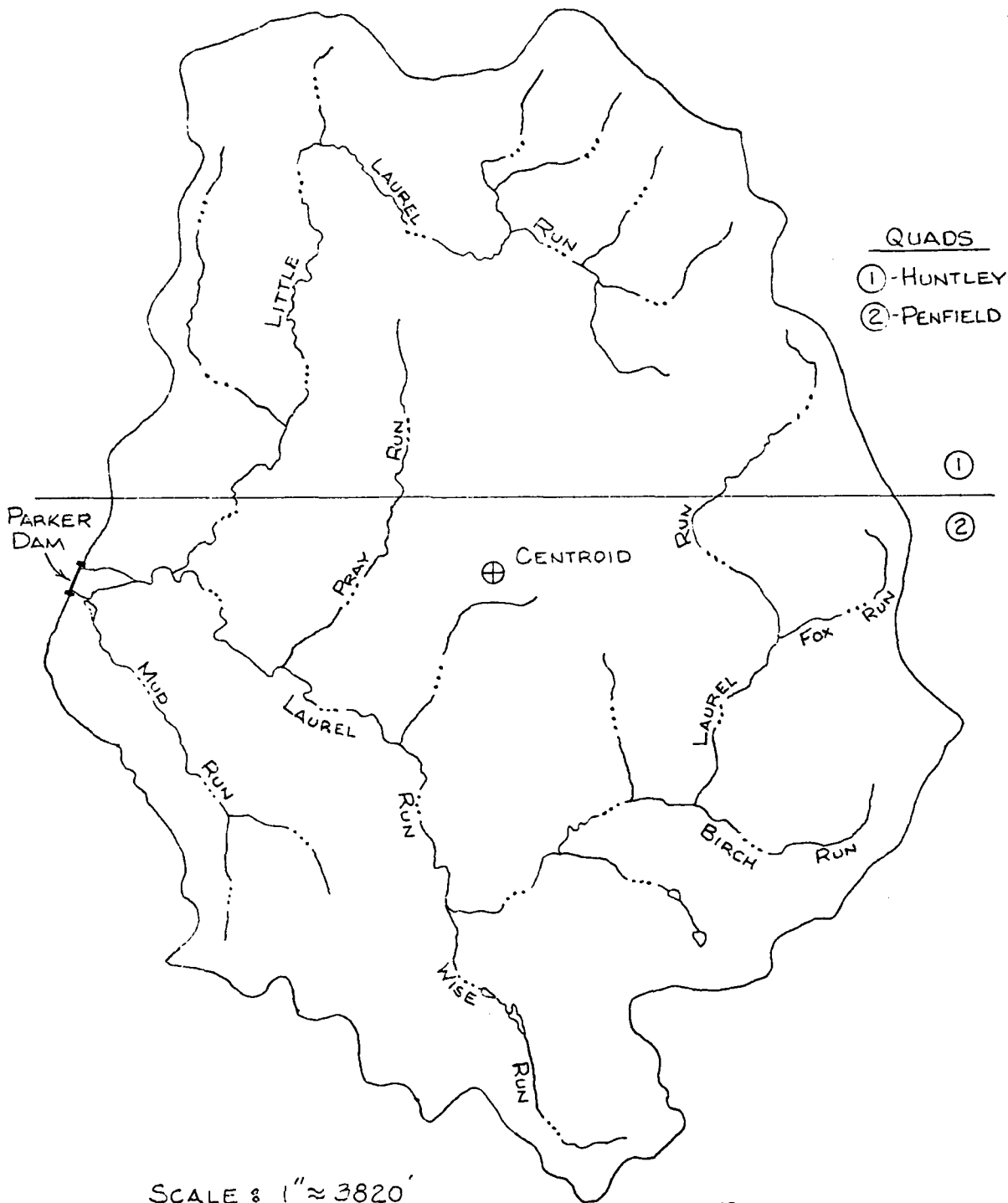
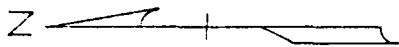
⁽²⁾ Hydrometeorological Report 33 (Figure 2), U.S. Army, Corps of Engineers, 1956.

⁽³⁾ Hydrological zone defined by Corps of Engineers, Baltimore District, for determining Snyder's Coefficients (C_p and C_t).

⁽⁴⁾ Snyder's Coefficients.

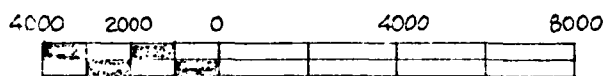
⁽⁵⁾ L = Length of longest water course from outlet to basin divide.

L_{ca} = Length of water course from outlet to point opposite the centroid of drainage area.



QUADS
① - HUNTLEY
② - PENFIELD

SCALE : 1" \approx 3820'



PARKER DAM

MICHAEL BAKER, JR., INC.
THE BAKER ENGINEERS

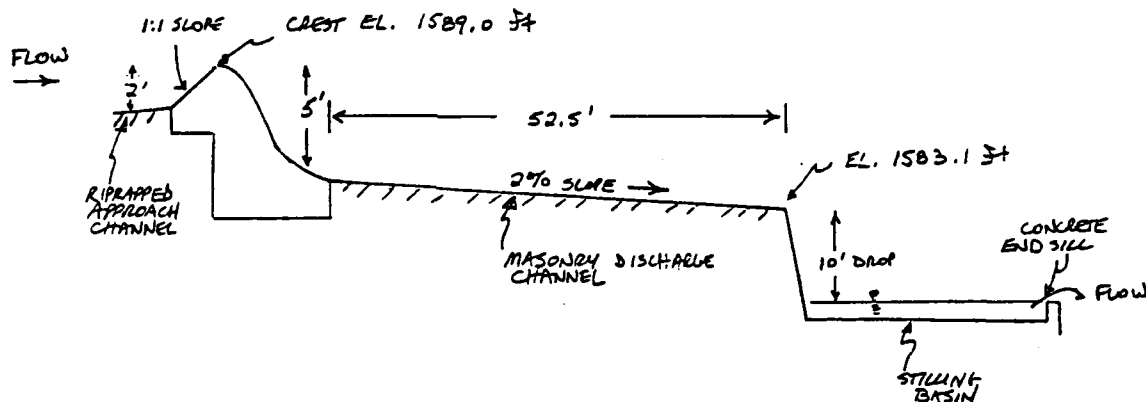
Box 280
Beaver, Pa. 15009

Subject PARKER DAM S.O. No. _____
SPILLWAY CONFIGURATIONS Sheet No. 3 of 10
Drawing No. _____
Computed by WDL Checked by LAD Date _____

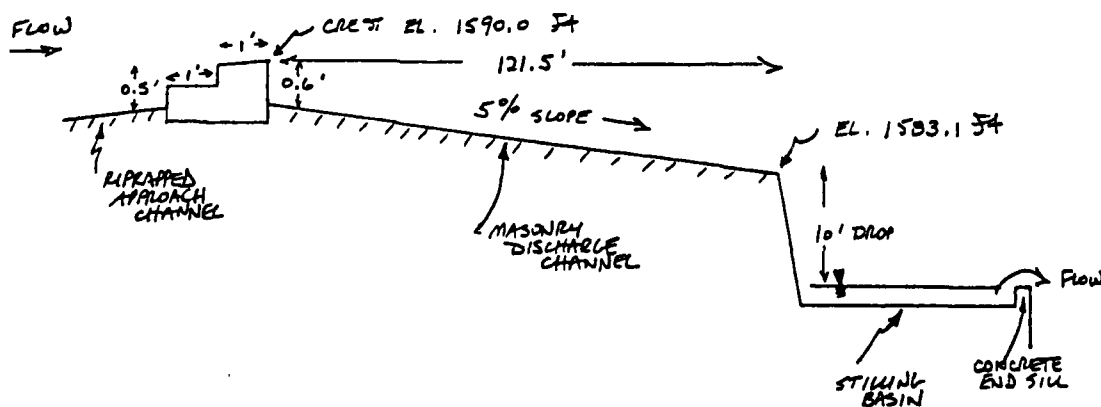
A PLAN VIEW OF THE SPILLWAYS IS PRESENTED IN
APPENDIX A ON THE FIELD SKETCH OF THE DAM.

PROFILES OF EACH SPILLWAY ARE SHOWN BELOW:

PRINCIPAL SPILLWAY: (CONCRETE, Ogee WEIR WITH AN INCLINED FACE)



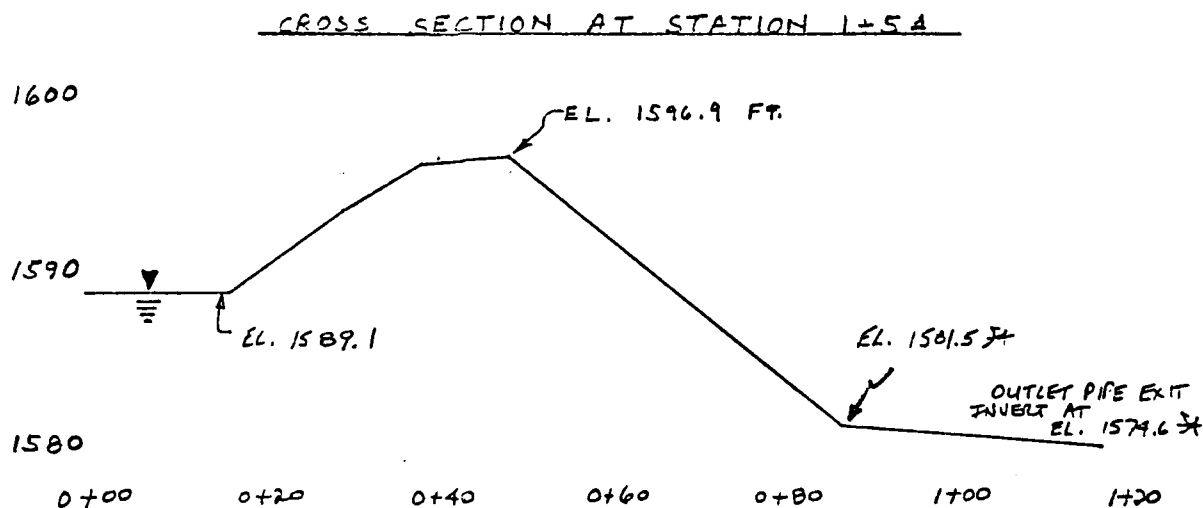
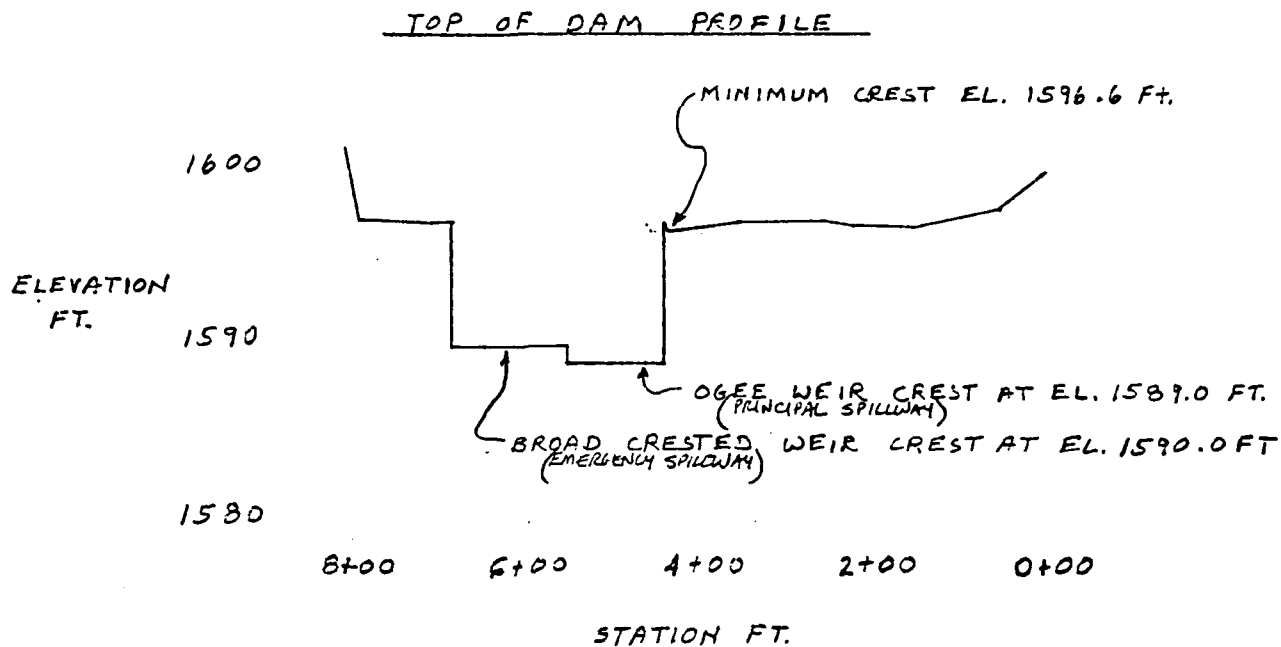
EMERGENCY SPILLWAY: (BROAD-CRESTED, MASONRY BLOCK WEIR)



MICHAEL BAKER, JR., INC.
THE BAKER ENGINEERS

Box 280
Beaver, Pa. 15009

Subject PARKER DAM S.O. No. _____
TOP OF DAM PROFILE Sheet No. 4 of 10
AND CROSS-SECTION Drawing No. _____
Computed by LAD Checked by WDL Date 7/3/32



MICHAEL BAKER, JR., INC.

THE BAKER ENGINEERS

Box 280
Beaver, Pa. 15009Subject PARKER DAM

S.O. No. _____

HYDRAULIC DATASheet No. 5 of 10

Drawing No. _____

Computed by WDL Checked by LAD

Date _____

STORAGE CALCULATIONS :SURFACE AREA VS. ELEVATION DATA (FROM USGS QUAD)

<u>ELEVATION, FT</u>	<u>AREA, ACRES</u>
1589.0	19.9
1600	44.4
1620	149.4

NORMAL POOL AT EL. 1589.0 FT

NORMAL POOL STORAGE :

$$V_{NP} = \frac{h}{3} (A_1 + A_2 + \sqrt{A_1 A_2})$$

h = AVERAGE DEPTH = 5.5 FT
 : (ESTIMATED FROM MEASUREMENTS
 MADE DURING INSPECTION)

A_1 = AREA AT NORMAL POOL
 = 19.9 AC.

A_2 = AREA AT ZERO STORAGE = 18.4 AC.
 (ESTIMATED FROM AVERAGE DEPTH
 AND SURROUNDING WATERSHED SLOPES)

$$V_{NP} = \frac{5.5}{3} (19.9 + 18.4 + \sqrt{(19.9)(18.4)})$$

$$V_{NP} = 105.3 \text{ AC-FT}$$

TOP OF DAM STORAGE (EL. 1596.6 FT)

$$V_A = \frac{h}{3} (A_1 + A_2 + \sqrt{A_1 A_2}) = \text{STORAGE BETWEEN NORMAL POOL AND TOP OF DAM ; } h = 7.6 \text{ FT}$$

$$V_A = \frac{7.6}{3} (19.9 + 36.8 + \sqrt{(19.9)(36.8)})$$

 $A_1 = 19.9 \text{ AC.}$ $A_2 = 36.8 \text{ AC.}$

$$V_{\text{TOP OF DAM}} = V_A + V_{NP} = 317.5 \text{ AC-FT}$$

$$\text{STORAGE AT EL. 1596.6 FT} = \underline{317.5 \text{ AC-FT.}}$$

MICHAEL BAKER, JR., INC.
THE BAKER ENGINEERS

Box 280
Beaver, Pa. 15009

Subject PARKER DAM S.O. No. _____
SPILLWAY RATING INFORMATION Sheet No. 6 of 10
Drawing No. _____
Computed by WDL Checked by LAD Date _____

SPILLWAY DISCHARGE COEFFICIENTS:

PRINCIPAL SPILLWAY

THE GENERALIZED DESIGN CURVES FOR SHAPING Ogee WEIRS IN DESIGN OF SMALL DAMS, U.S. DEPT. OF THE INTERIOR, BUREAU OF RECLAMATION, WERE USED TO DETERMINE THAT THE DESIGN HEAD FOR THIS WEIR IS APPROXIMATELY 2.0 FT ($H_0 = 2.0$ FT)

$$\frac{\text{APPROACH DEPTH}}{H_0} = \frac{2.0}{2.0} = 1$$

USING FIGURES 249-254 IN DESIGN OF SMALL DAMS:

FOR $\frac{P}{H_0} = 1$, C_0 FOR A VERTICAL-FACED WEIR IS 3.88

CORRECTION FACTOR FOR THE ENCLINED FACE IS 0.998

$$C_{\text{INCLINED}} = 0.998 C_0 = 0.998 (3.88) = 3.87$$

CORRECTING FOR SUBMERGENCE DURING HIGH FLOWS:

$$C_{\text{SUBMERGED}} = \text{CORRECTION FACTOR} \times (3.87) \quad \left[\text{CORRECTION FACTOR FOR PEAK DISCHARGE USED} \right]$$

$$C_{\text{SUBMERGED}} = 0.86 (3.87) = 3.33$$

$$\text{THEN: } Q_{\text{PRINCIPAL SPILLWAY}} = 3.33 (109.6) H^{3/2} = 365 H^{3/2}$$

EMERGENCY SPILLWAY:

BROAD-CRESTED WEIR WITH LOW HEIGHT,
FROM BRATER & KING, HAND BOOK OF HYDRAULICS, USE

$$C = 3.08$$

$$Q_{\text{EMERG. SPILLWAY}} = 3.08 (132.2 \text{ FT}) H^{3/2} = 407 H^{3/2}$$

 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION JULY 1973
 LAST MODIFICATION 26 FEB 79
 NJJ UPDATE 04 JUN 79

RUN DATE 07/08/80
 TIME 15.01

NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS
 HYDROLOGIC AND HYDRAULIC ANALYSES OF PARKER DAM
 UNIT GRAPH BY SNYDER'S METHOD

NC NHR NMN IDAY INH IAIN METRG IPLT IPRT NSIAN
 300 0 30 0 0 0 0 0 0 0 0
 JUPER 5 0 0 0 0 0 0 0 0 0 0

MULTI-PLAY ANALYSES TO BE PERFORMED
 NPLAN= 1 NRTIU= 1 LRTIU= 1

RTIUS= 0.50

SUB-AREA RUNOFF COMPUTATION

RUNOFF HYDROGRAPH TO DAM

ISTAQ ICOMP IFGUN ITAPL JPLT JPRT INAME ISTAGE IAUTJ
 1 0 0 0 0 0 0 1 0 0

HYDROGRAPH DATA

IIVUG IUNG TAPEA SHAP TRSDA TRSPC KATIO ISNUM I-NAME LOCAL
 1 1 17.92 0.0 0.0 17.92 0.0 0.0 0 0 0

PRECIP DATA

SPFE PMS R6 R12 R24 R48 R72 R96
 0.0 23.10 110.00 120.00 133.00 144.00 0.0 0.0

TRSPC COMPUTED BY THE PROGRAM IS 0.820

LUSS DATA

LKUPI STAKR DLTKR RTIOL ERAIN STRKS RTIUK STRTL CNSTL ALSMA RTIMP
 0 0.0 0.0 1.00 1.00 0.0 0.0 1.00 1.00 0.05 0.0 0.0

UNIT HYDROGRAPH DATA

TP= 5.03 CP=0.45 RTI= 0

RECESSION DATA

SIRTO= -1.50 O-CSI= -0.05 RTIUR= 2.00

UNIT HYDROGRAPH 91 END-OF-PERIOD ORDINATES, LAG= 5.05 HOURS, CP= 0.45 VOL= 1.00
 29. 110. 225. 362. 515. 673. 825. 981. 1055. 1055.
 1065. 992. 932. 875. 822. 772. 725. 681. 643. 601.
 565. 530. 498. 468. 440. 413. 388. 364. 342. 321.
 302. 283. 266. 250. 235. 221. 207. 195. 183. 172.

SHEET 8 OF 10

PEAK FLOW AND STORAGE (END UP PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
 AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	RATIOS APPLIED TO FLOWS	
			PLAN	RATIO 1
HYDROGRAPH AT	1	17.92	1	10205
	(46.41)	(288.961)
<p>MINIMUM INFLOW TO THE RESERVOIR FOR THE 1/2 PMF IS 10,205 CFS.</p>				
<p>THE TOTAL SPILLWAY CAPACITY AT THE TOP OF THE DAM, EL. 1592.6 FT., IS:</p>				
<p>PRINCIPAL SPILLWAY CAPACITY = 76.47 CFS (7.6 FT HEAD) EMERGENCY SPILLWAY CAPACITY = 6900 CFS (6.6 FT HEAD) TOTAL CAPACITY = 14,547 CFS</p>				
<p>TOTAL CAPACITY OF THE SPILLWAYS EXCEEDS MAXIMUM INFLOW TO THE RESERVOIR DURING THE SAF. THEREFORE, THE DAM IS NOT OVERFLOWED DURING THE SDF.</p>				

SHEET 10 OF 10

APPENDIX E

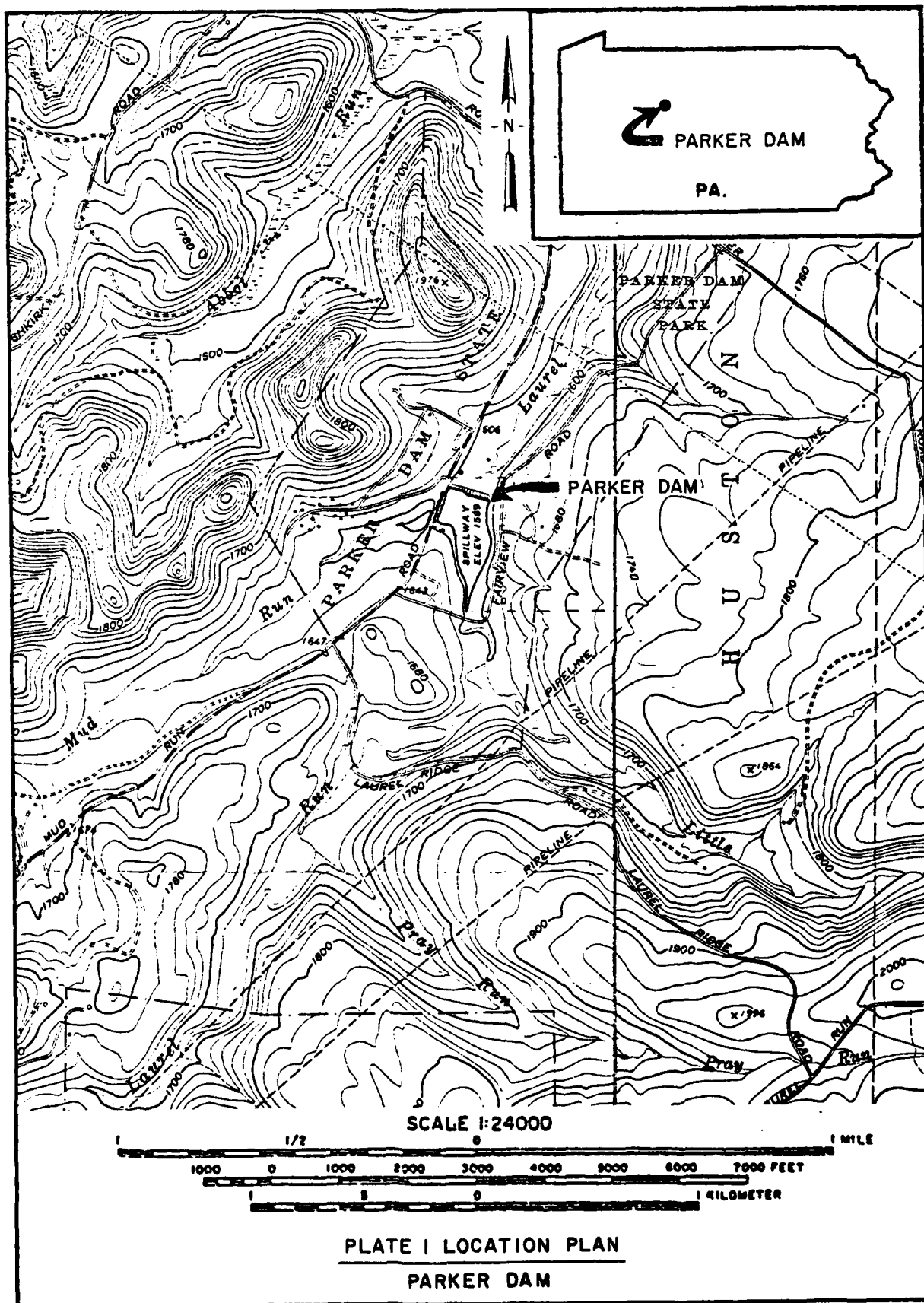
PLATES

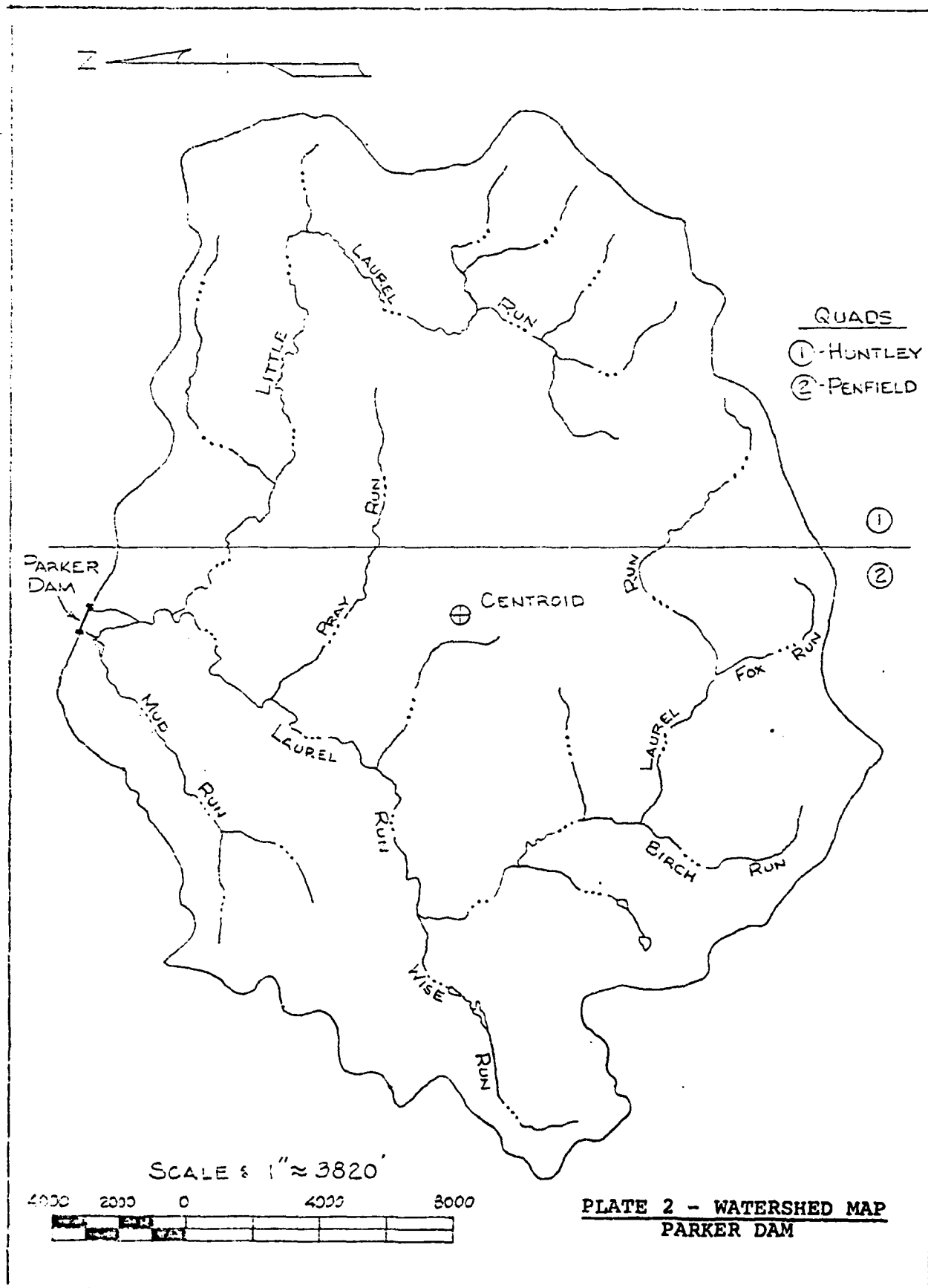
CONTENTS

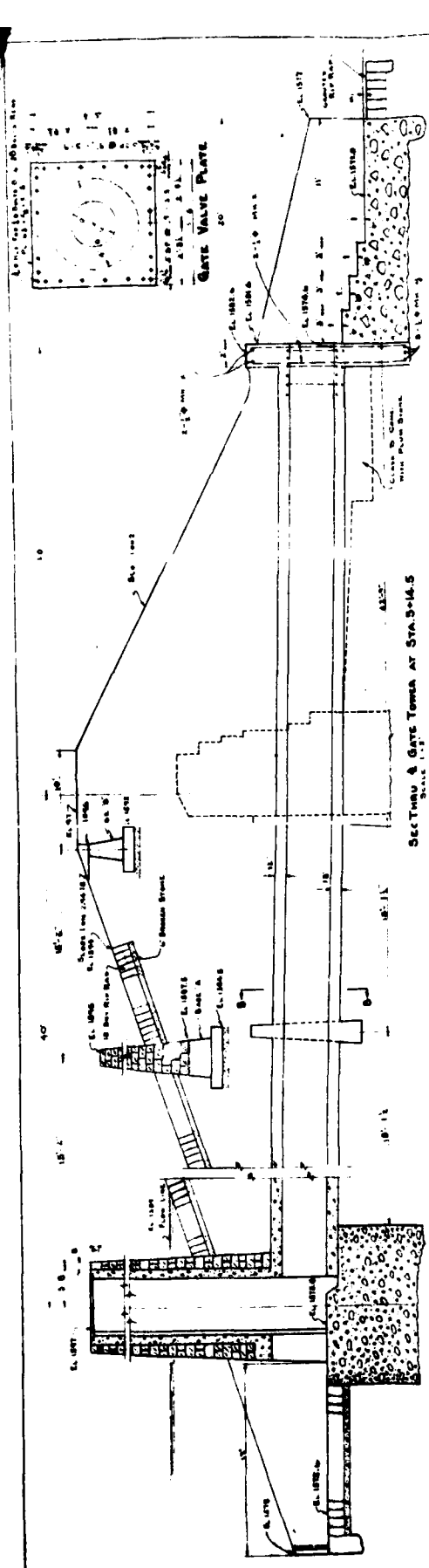
Plate 1 - Location Plan

Plate 2 - Watershed Map

Plate 3 - Gate Tower and Details



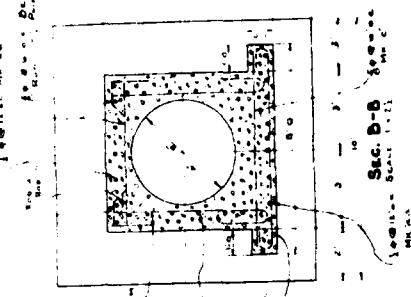




THIS PAGE IS BEST QUALITY PHOTOGRAPH
FROM COPY FURNISHED TO BNA

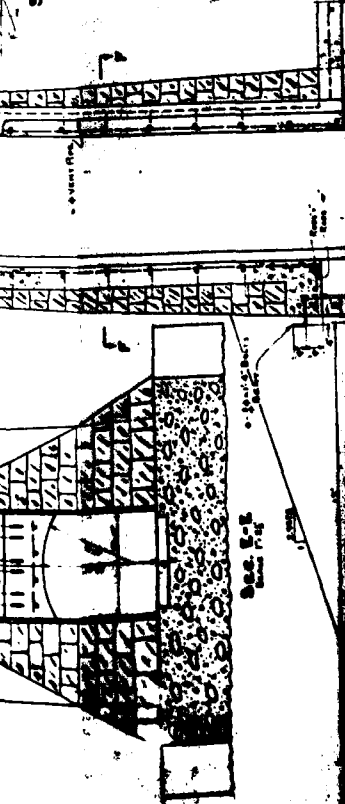
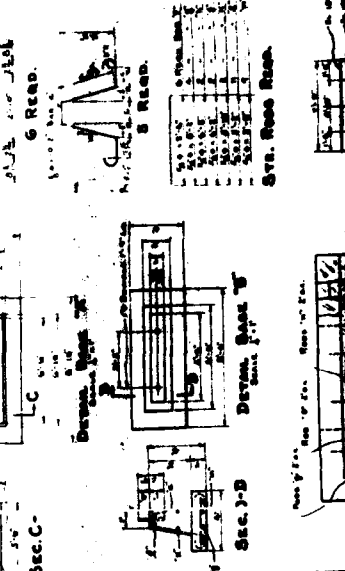
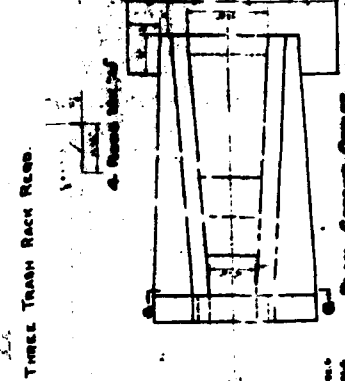
15 Lateral Runes Rees

1	17' 10" x 10" x 10"
2	17' 10" x 10" x 10"
3	17' 10" x 10" x 10"
4	17' 10" x 10" x 10"
5	17' 10" x 10" x 10"
6	17' 10" x 10" x 10"
7	17' 10" x 10" x 10"
8	17' 10" x 10" x 10"
9	17' 10" x 10" x 10"
10	17' 10" x 10" x 10"
11	17' 10" x 10" x 10"
12	17' 10" x 10" x 10"
13	17' 10" x 10" x 10"
14	17' 10" x 10" x 10"
15	17' 10" x 10" x 10"



Sta. Rees Rees

1	17' 10" x 10" x 10"
2	17' 10" x 10" x 10"
3	17' 10" x 10" x 10"
4	17' 10" x 10" x 10"
5	17' 10" x 10" x 10"
6	17' 10" x 10" x 10"
7	17' 10" x 10" x 10"
8	17' 10" x 10" x 10"
9	17' 10" x 10" x 10"
10	17' 10" x 10" x 10"
11	17' 10" x 10" x 10"
12	17' 10" x 10" x 10"
13	17' 10" x 10" x 10"
14	17' 10" x 10" x 10"
15	17' 10" x 10" x 10"



APPENDIX F

REGIONAL GEOLOGY

PARKER DAM
NDI No. PA 01126, PennDER No. 17-87

REGIONAL GEOLOGY

Parker Dam is located in an unglaciated section of the Appalachian Plateaus physiographic province. The geologic map on the following page shows that the bedrock units below the dam are members of the Pocono group, Mississippian system. This group consists mainly of light to dark gray and greenish-gray, fine- to coarse-grained, cross-bedded, conglomeratic beds of sandstone; occasional thin beds of gray, grayish-green, red and purple shales and siltstones; and a few coal beds. However, the "Geologic Map of the Sabula and Penfield quadrangles," Atlas Series A 74ab, Pennsylvania Geological Survey, 1976, shows the dam to be located on the Elliott Park formation, Pottsville group. This formation is fine to medium grained, cross-bedded, light to medium gray sandstone. This later map is probably a more accurate map. No mining activity has taken place within the vicinity of the dam.



LEGEND

PERMIAN



Greene Formation

Cyclic sequences of sandstone, shale, red beds, limestone and coal, base at the top of the Upper Washington Limestone.

PERMIAN AND PENNSYLVANIAN



Washington Formation

Cyclic sequences of sandstone, shale, limestone and coal; some red shale, some mineable coal; base at the top of the Waynesburg Coal.

PENNSYLVANIAN

APPALACHIAN PLATEAU



Monongahela Formation

Cyclic sequences of sandstone, shale, limestone and coal; limestone prominent in northern outcrop areas; shale and sandstone increase southward; commercial coals present; base at the bottom of the Pittsburgh Coal.



Conemaugh Formation

Cyclic sequences of red and gray shales and siltstones with thin limestones and coals; massive blocky sandstone commonly present at base; Area Limestone present in middle of section; Brush Creek Limestone in lower part of section.



Allegheny Group

Cyclic sequences of sandstone, shale, limestone and coal; numerous commercial coals; limestone thins westward. Lower part limestone in lower part of section includes Freeport, Kittanning, and Clarion Formations.



Pottsville Group

Predominantly sandstones and conglomerates with thin shales and coals; some coals mineable locally.

ANTHRACITE REGION



Post-Pottsville Formations

Brown to gray sandstones and shales with some conglomerate and numerous mineable coals.



Pottsville Group

Light gray to white, coarse grained sandstones and conglomerates with some mineable coal; includes Sharp Mountain, Schuylkill, and Tumbling Run Formations.

MISSISSIPPIAN



Mauch Chunk Formation

Red shales with brown to greenish gray thin sandstones; includes Greenbrier Limestone in Fayette, Westmoreland, and Somerset counties; Logan Run Limestone at the base in southwestern Pennsylvania.



Pocahontas Group

Predominantly gray, hard, massive, cross-bedded conglomerates and sandstones with some shale; includes in the Appalachian Plateau: Thurman, Shenandoah, Cuyahoga, Chassanup, Corra, and Kopp Formations; includes part of Osage of M. L. Fuller in Potter and Tioga counties.

WESTERN PENNSYLVANIA



Oswayo Formation

Greenish gray to gray shales, siltstones and sandstones becoming increasingly shaly westward; considered equivalent to type Oswayo, Riceville Formation Or in Erie and Crawford Counties; probably not distinguishable north of Corry.



Cattaraugus Formation

Red, gray and brown shale and sandstone with the proportion of red decreasing westward; includes Venango sands of drillers and Salamanca sandstone and conglomerate; some limestone in Crawford and Erie counties.



Conneaut Group

Alternating gray, brown, greenish and purplish shales and siltstones; includes "pink rock" of drillers and "Chimney" and "Gravel" Formations of northwestern Pennsylvania.



Canadaway Formation

Alternating brown shales and sandstones; includes "Porage" Formation of northwestern Pennsylvania.

**DATA
FILM**

2-